

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

1. (Currently Amended) A charge transfer apparatus comprising:  
a semiconductor region of one conductivity type ~~forming~~ including a resistor region;  
a charge transfer region of a conductivity type opposite to the conductivity type of said semiconductor region that is formed in said semiconductor region and joined to said semiconductor region to form a diode;  
a signal charge input portion adapted to input a signal charge to ~~the~~ said charge transfer region;  
a signal charge output portion adapted to accumulate the signal charge transferred from the said charge transfer region; and  
a plurality of independent potential supply portions adapted to supply a potential gradient to said semiconductor region independently of said charge transfer region, said signal charge input portion and said signal charge output portion, said plurality of independent potential supply portions supplying said semiconductor region with respectively different potentials, said plurality of independent potential supply portions being connected to each other through said ~~semiconductor~~ resistor ~~region forming the resistor, wherein the~~ charge transfer region is completely depleted before the signal charge is input formed in said semiconductor region,

wherein the signal charge in ~~the~~ said charge transfer region is transferred by the potential gradient formed by said plurality of potential supply portions, and

wherein the signal charge in said charge transfer region is transferred by drift over all of said charge transfer region.

2. (Canceled)

3. (Previously Presented) An apparatus according to claim 1, wherein the charge transfer region is buried in said semiconductor region and forms a buried diode together with said semiconductor region.

4. (Currently Amended) A charge transfer apparatus comprising:  
a semiconductor substrate of one conductivity type;  
a well ~~forming~~ including a resistor region of a conductivity type opposite to the conductivity type of said semiconductor substrate that is formed in said semiconductor substrate;

a charge transfer region of a conductivity type opposite to the conductivity type of said well that is formed in said well and joined to said well to form a diode;

a signal charge input portion adapted to input a signal charge to ~~the~~ said charge transfer region;

a signal charge output portion adapted to accumulate the signal charge transferred from ~~the~~ said charge transfer region; and

a plurality of independent potential supply portions adapted to supply a potential gradient to said well independently of said charge transfer region, said signal charge input portions and said signal charge output portion, said plurality of independent potential supply portions supplying said well with respectively different potentials, and said plurality of independent potential supply portions being connected to each other through the well forming the resistor, ~~wherein the charge transfer region is completely depleted before the signal charge is input~~ said resistor formed in the well,

wherein the signal charge in the said charge transfer region is transferred by the potential gradient formed by said plurality of potential supply portions, and

wherein the signal charge in said charge transfer region is transferred by drift over all of said charge transfer region.

5. (Canceled)

6. (Previously Presented) An apparatus according to claim 4, wherein the charge transfer region is buried in said well and forms a buried diode together with said well.

7-17. (Canceled)

18. (New) A charge transfer apparatus comprising:

a semiconductor region of one conductivity type including a resistor region,

a charge transfer region of a conductivity type opposite to the conductivity type of said semiconductor region that is formed in said semiconductor region and joined to said semiconductor region to form a diode;

a signal charge input portion adapted to input a signal charge to said charge transfer region;

a signal charge output portion adapted to accumulate the signal charge transferred from said charge transfer region; and

a plurality of independent potential supply portions adapted to supply a potential gradient to said semiconductor region independently from said charge transfer region, said signal charge input portion and said signal charge output portion, said plurality of independent potential supply portions supplying said semiconductor region with respectively different potentials, and said plurality of independent potential supply portions being connected to each other through said resistor region formed in said semiconductor region, wherein the charge transfer region is depleted before the signal charge is input,

wherein the signal charge in said charge transfer region is transferred by the potential gradient formed by said plurality of potential supply portions, and

wherein the signal charge in said charge transfer region is transferred by drift over all of said charge transfer region.